TELEVISION EXPERT TO REVEAL NEW ELECTRICAL EYE

NOVEL RADIO OPTIC "SEES"

Dr. Zworykin to Describe His Iconoscope "Eye," Called Fully Adequate for Television—Speed Equals Movie Camera

By ORRIN E. DUNLAP Jr.

THE results of ten years of television research will be revealed tomorrow by Dr. Vladimir K. Zworykin, the inventor, who has directed the search for television for the RCA-Victor Company. He will lecture before the Institute of Radio Engineers in Chicago. The secret of his magic is hidden in a sensitive electric eye. One tube "sees" a scene for transmission and another tube reproduces the picture after it has been tossed through space by radio.

While many experimenters have sought to solve the elusive television puzzle by means of a revolving disk or scanner that chops the picture into tiny pieces for broadcasting and then reassembles the mosaic at the receiver, Zworykin believed they were on the wrong track. Several years ago in a lecture at Rochester he pointed out that the successful clues to television rested in the human eye. He was convinced that for man to perfect television he must invent a device to emulate the eye with its retina and optic nerve. Those who know Zworykin are mindful that he is a deep student of nature, for in nature he finds the model of perfection—the goal. In 1929 he announced that he was meeting with success in the research laboratory of the Westinghouse Electric and Manufacturing Company.

Sarnoff's Vision Helped.

He tried to convince industrialists that he had the right approach to television. The story is told how some one suggested that David Sarnoff, president of the RCA, was the man to see in order to "sell" the idea. For a half-hour Mr. Sarnoff listened intently to Zworykin's magic tale.

"It's too good to be true," replied Sarnoff. "What will it cost to develop the idea?"

"About $100,000," answered Zworykin.

"All right," said Sarnoff, "it's worth it."

And so Zworykin, with funds for new apparatus and experimentation, rushed ahead with his television eye, the details of which he is now ready to disclose.

* * *

Derivation of the Name.

THE electrical optic is called an Iconoscope; "icon" in Greek meaning image, and "scope," to observe. Therefore, the Iconoscope or bulb used in transmission observes the scene. The receiving tube, shaped like a funnel, has been named kinescope: "kine" meaning motion in Greek. So the kinescope observes the motion. On the flat end of this funnel-shaped tube the scene appears like a motion picture. Both tubes are strikingly like the human eye in performance. And being like the human optic, these tubes virtually extend the range of the optic nerve so man can see far beyond the horizon.

Radio engineers assembled in Chicago will be anxious to learn in detail how Zworykin has succeeded in perfecting an electrical retina and a controlled electrical beam that performs the same function as the optical nerve, which flashes the picture to the brain. In television the "brain" is the radio receiver.

Those who have seen the Zworykin system in operation have been astounded at the clarity and size of the pictures. One observer told how at one demonstration the television camera was set up alongside a road and two automobiles collided. The electric eye behind the camera's lens caught the scene and spectators several miles distant witnessed the "accident."

It is understood that the picture showing on the Iconoscope is approximately four by five inches but that it can be reflected on a large screen.

Those familiar with the operation say the picture is as clear as a halftone and is free of streaks and lines heretofore an annoyance in television pictures. In fact, the images are so distinct that ordinary photographs can be made of the pictures on the screen. This means that the room need not be darkened to view the picture and the camera with its sensitive eye functions in daylight without the aid of glaring artificial lights. All that is required with the radio-vision camera and its tripod is an amplifier in a separate compact case, easily transported.

It is expected that when the receiver is introduced for home use, it will be designed in at least two models; one a comparatively small outfit the cover of which has a mirror on the inside. The Iconoscope will be in the top of the cabinet and will reflect the image to the mirror so the picture will be as large as the raised cover of the set. The other outfit will probably cast the pictures on a screen.

The main patent covering the Zworykin Iconoscope ideas was filed July 13, 1925, and was issued Nov. 13, 1928. It is No. 1,691,324, and is likely to be historic in the annals of television, as was the Marconi tuning patent, No. 7777.

* * *

THE plan is to use ultra short-wave sets operating on about six meters. This means that each city will have its own television station because the tiny waves generally stop at the curvature of the earth. For example, the television station atop the Empire State Building has a maximum range of no more than sixty miles, the theoretical horizon.

There is no evidence now that the present broadcasting structure will be disturbed. It serves a coast-to-coast audience. The ultra short-wave television stations cannot do that until some ingenious inventor discovers a way to successfully link all the image transmitters, and there will probably be hundreds of them. On this basis television will probably get its start in the thickly populated areas, with New York, Chicago, Boston, Detroit and Los Angeles leading.

So successful have been the Zworykin results that the problem is said to be no longer electrical. Apparently television now rests in the laps of the financial and merchandising experts.

The retail price will depend upon the number of instruments manufactured. If only one set is built it might cost $10,000; but if mass-production methods turn out thousands of outfits then the cost might be around $100. That has not been determined, neither has the day when the set will be marketed.

The depression has enabled Zworykin and his staff of experimenters a longer period of research, untormented by anxious merchandisers. Therefore, when the apparatus is offered to the public it will be more perfect than if prematurely presented in 1929. Zworykin once remarked that it would be unfortunate to offer television too early, because once in the hands of the populace development is frozen. Then the changes must be gradual from year to year. But if the devices are withheld in the laboratory, equipment can be scrapped and revolutionary changes can be made overnight.

Television, while it looms as a new and profitable industry—a unique service to mankind—is the nucleus of new magic that will spread into other fields of science.

* * *

He Came From Russia.

AS a young man Zworykin studied under Boris Rosing, Professor of Physics at the Technological Institute in Leningrad. Rosing was a pioneer in realizing the possibilities of cathode rays as applied to television. Zworykin was graduated from the institute in 1912. Until 1914 he worked in Paris under Professor Paul Langeven, and won a Ph. D. at the College of France in Paris. During the World War Zworykin was in the Signal Corps of the Russian Army and worked on wireless. Then he decided to circle the globe and after two trips around the earth decided the United States was the land of opportunity. He came to America in 1919, and in 1920 went to work in the Westinghouse research laboratory, now called "Miracle Hill."

Science came near losing Zworykin in the Akron disaster. For several weeks he was scheduled to make a flight in the dirigible for the purpose of experimenting with his Iconoscope or television camera The plan was to sail above the clouds and drop the "eye" on the end of a cable so the crew could see the scene below the clouds. Fate postponed the test.

Zworykin, in revealing the results of ten years' plodding along the highway of science, will describe the "eye," the key to television. But in such scientific papers no mention is made of the disappointments encountered. The finished product always seems so simple, especially after some complex idea of man is discarded for clues that nature drops.

One who saw the Zworykin pictures on a screen remarked, "This is not merely a step forward in television. It goes over the wall that has stopped all experimenters. Television is here."

The June issue of the Proceedings of the Institute of Radio Engineers reports the Iconoscope's sensitivity as being "approximately equal to that of photographic film operating at the speed of a motion-picture camera—fully adequate for television."

The inventor plans to sail for Europe in July and has invitations to lecture on television in London, Paris, Berlin and Moscow.

Dr. Vladimir Zworykin, Television Inventor, Who Will Describe His New "Radio Eye" Tomorrow at a Meeting of the Institute of Radio Engineers in Chicago. He Is Shown Here With a Photoelectric Cell From Which the New Tube Evolved.